

## **New Hampshire Department of Environmental Services**

### **RESPONSE TO PUBLIC COMMENT ON THE DRAFT 2008 CONSOLIDATED ASSESSMENT AND LISTING METHODOLOGY (CALM)**

2/21/2008

On May 29, 2007, the New Hampshire Department of Environmental Services (DES) requested comments on the 2006 Consolidated Assessment and Listing Methodology (CALM) which served as a draft of the CALM for the 2008 Section 305(b) and 303(d) Surface Water Quality Report (i.e., the 2008 CALM). Downloadable copies of the 2006 CALM and list of possible revisions were made available on the DES website for review ([www.des.state.nh.us/wmb/swqa/](http://www.des.state.nh.us/wmb/swqa/)). In addition, the following organizations/agencies were notified by email:

Appalachian Mountain Club  
Audubon Society  
Connecticut River Joint Commissions  
Conservation Law Foundation  
County Conservation Districts  
Lake and River Local Management Advisory Committees  
Maine Department of Environmental Protection  
Manchester Conservation Commission  
Massachusetts Department of Environmental Protection  
Merrimack River Watershed Council  
National Park Service  
New England Interstate Water Pollution Control Commission  
NH Department of Health and Human Services  
NH Coastal Program  
NH Rivers Council  
North Country Council  
Regional Planning Commissions  
Society for the Protection of National Forests  
Natural Resources Conservation Service  
The Nature Conservancy  
Upper Merrimack River Local Advisory Committee  
US Environmental Protection Agency  
US Geological Survey  
US Fish and Wildlife Service  
US Forest Service  
University of New Hampshire  
Vermont Department of Environmental Conservation  
Volunteer Lakes Assessment Program  
Volunteer Rivers Assessment Program  
Water Quality Standards Advisory Committee

The public comment period ended on June 28, 2007. The following represents the Department's response to public comments received during this period. Each comment is numbered and preceded by a general description of the subject matter. The Department's response immediately follows each comment (in bold font).

## A. RESPONSE TO PUBLIC COMMENTS

### **Anthony J. Zuena and Kirsten N. Ryan of SEA Consultants Inc. on the behalf of the Town of Salem, New Hampshire**

#### **COMMENT (1):**

1. The CALM should be modified to account for the fact that there is a natural decrease in dissolved oxygen and pH with depth in stratified lakes. The CALM uses only the worst case value for a given sampling station and a given sampling day. Therefore, for sampling efforts that measure depth profiles of pH and DO (a valuable tool for studying lake structure and health) a single reading near the bottom of the hypolimnion (which is usually naturally depleted in DO and low in pH) can falsely flag the entire water column as impaired.

#### **DES RESPONSE:**

Assessment of dissolved oxygen in lakes is performed in accordance with the CALM and NH Surface Water Quality regulations (Env-Ws 1703.07(d)) which states the following:

“Unless naturally occurring or subject to (a) above [*note - this refers to dissolved oxygen for Class A waters*], surface waters within the top 25% of depth of thermally unstratified lakes, pond, impoundments, and reservoirs or within the epilimnion shall contain a dissolved oxygen content of at least 75 percent saturation, based on a daily average and an instantaneous minimum dissolved oxygen content of at least 5 mg/L. Unless naturally occurring, the dissolved oxygen content below those depths shall be consistent with that necessary to maintain and protect existing and designated uses.”

Consequently, when assessing most lakes for compliance with dissolved oxygen criteria, we use the values in the epilimnion in stratified lakes and in the top 25% of depth in unstratified lakes. Dissolved oxygen values in the hypolimnion are not used in the assessment.

However, when assessing pH, the commenter is correct in that we use the lowest value in the water column. This is because the criteria for pH has no specific provision for depth and therefore applies to the entire water column. The only exception to this is if the pH excursions are due to natural causes (see below).

Env-Ws 1703.18 pH.

- (a) The pH of Class A waters shall be as naturally occurs.
- (b) The pH of Class B waters shall be 6.5 to 8.0, unless due to natural causes.
- (c) The pH of waters identified in RSA 485-A:8, III shall be 6.0 to 9.0, unless due to natural causes.

With regards to criteria used to determine natural conditions, please see DES response to comment 3 below

#### **COMMENT (2):**

2. The requirement to use the ‘most recent full calendar year of data’ is not necessarily the best method for providing an accurate assessment; especially for lakes. We feel that this should be revised to: the most recent and complete set of

good quality data. For some years, you may have only a small data set or one data point; while an intensive and high quality sampling effort conducted within the past five years, especially for lakes, gives a very good picture approximating current lake conditions. With the one year rule, you will end up discarding or discounting a lot of valuable data needlessly. This is not an effective way to assess larger water bodies.

**DES RESPONSE:**

We strive to use the ‘most recent full calendar year of data’ for a given waterbody but rarely is there enough data within that timeframe. Even in cases where the ‘most recent full calendar year of data’ has enough information to make an assessment we review a full 10 years of data for lakes and 5 years of data for all other waterbody types. Hydrologic systems are driven by climatic conditions and therefore the level of stress on a given waterbody is, in part, driven by climate. For example, the winter of 2006/2007 was less cold and snowy than the winter of 2005/2006. If we had data under the 2005/2006 colder and snowier conditions it would be assessed even if we had a full dataset for 2006/2007. In practice this is how the assessments are conducted. The text in CALM Section 3.1.11, Data Age, will be updated for 2008 to clarify this issue.

No dataset is too small to be included in the assessment of a waterbody provided the data is of sufficient quality. In fact, we often find that small datasets are the reason why waterbodies are listed as impaired because they are typically collected under high stress (i.e., critical) conditions when impairments are most likely to occur.

Note that for impaired waterbodies, the data used to make the impairment remains in the assessment process regardless of age. In order to remove the waterbody from the impaired waters list, new data showing compliance with water quality standards would need to be collected during the critical time period as well as at the same location and similar time as the data used to impair the waterbody. In addition, we would need evidence of changes in the watershed that could justify compliance, or evidence that the original listing was based on faulty data or was due to naturally conditions (i.e., exceedances of water quality criteria due to naturally occurring conditions are not considering violations of water quality standards). Examples of such watershed changes could include elimination of illicit discharges of sewage, implementation of best management practices or more stringent effluent limits on wastewater treatment plants.

**COMMENT (3):**

3. Naturally Occurring Exceedances: We support the efforts of the Water Quality Standards Advisory Committee to develop guidance for establishing numerical criteria for naturally occurring conditions based on reference water bodies. We are disappointed that no further progress in this effort has been made in over a year. We hope that this Committee can be re-activated and finalize the guidance already in progress.

Language in Section 3.1.8 of the 2006 CALM: Examples of naturally occurring conditions cited by USEPA (1997) are given. We submit that additional examples should be included, such as 1) naturally high color in lakes due to the presence of organic humic/fulvic acids and 2) naturally high levels of nitrogen, phosphorous, and chlorophyll in lakes and ponds that are undergoing natural eutrophication. As in our comment 1, we also submit that low pH and DO readings in the hypolimnion of stratified lakes in summer represent a naturally occurring condition.

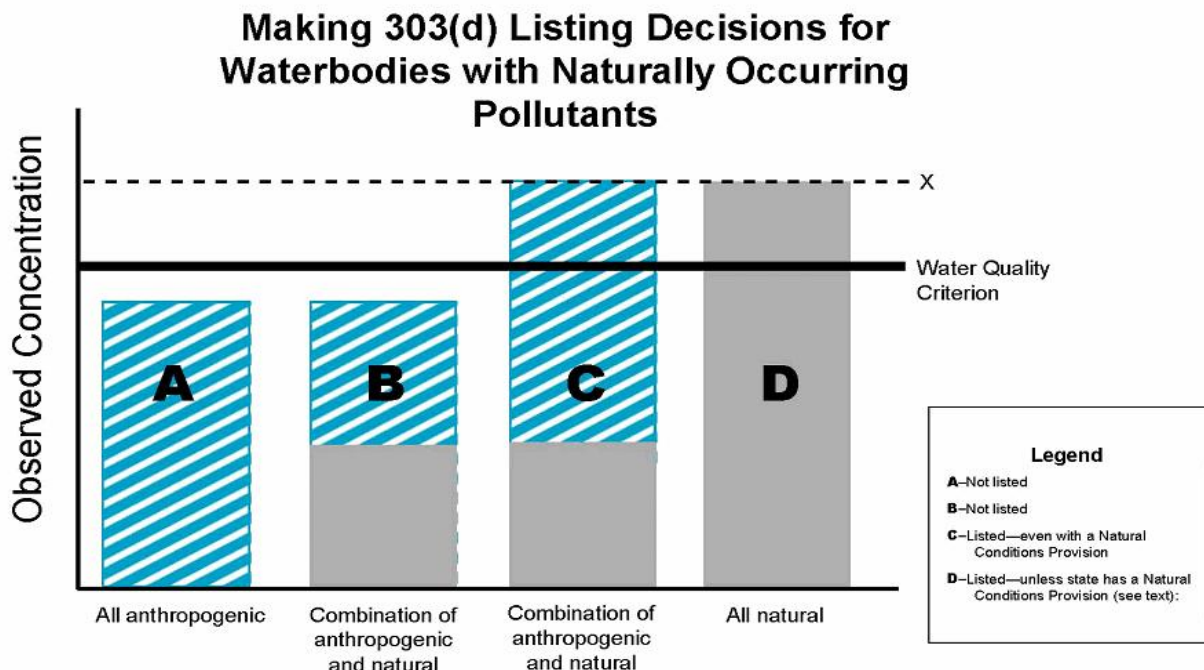
### **DES RESPONSE:**

DES is pleased to report that the Water Quality Standards Advisory Committee (WQSAC) was reactivated in December 2007 and has a full agenda of water quality standard issues to address. To work through these issues the WQSAC plans to meet approximately every 2 months in 2008.

With regards to determining water quality criteria exceedances due to natural conditions, EPA guidance states the following:

“States and Tribes may establish site specific numeric aquatic life water quality criteria by setting the criteria value equal to natural background. Natural background is defined as background concentration due only to non-anthropogenic sources, i.e., non-manmade sources.”  
(source: EPA, <http://www.epa.gov/waterscience/library/wqcriteria/naturalback.pdf>)

Further in “Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions”(EPA, October 12, 2006 [http://www.epa.gov/owow/tmdl/2008\\_ir\\_memorandum.html](http://www.epa.gov/owow/tmdl/2008_ir_memorandum.html)) EPA provides a good visual interpretation of the situations under which a should be listed as impaired or listed as meeting water quality standards due to naturally occurring exceedances of water quality criteria . In the figure below, “A” and “B” are not listed as impaired since water quality criteria are met, “C” is listed as impaired even though the majority of the impairment is due to natural conditions, and “D” is listed as impaired unless the State’s water quality standards allow for naturally occurring exceedances of water quality criteria (i.e., a naturally occurring provision). Since it is very difficult to separate between the natural and anthropogenic portions of a water quality exceedence the “...unless naturally occurring..” provision is rarely used.



**Column A** – The waterbody receives only anthropogenic pollutant loadings. The waterbody does not have to be included on the 303(d) list or placed into Category 5 because the applicable numeric criterion is not exceeded.

**Column B** – The waterbody receives pollutant loadings from both natural background and anthropogenic sources, but because the applicable numeric criterion is not exceeded, the waterbody does not have to be included on the 303(d) list or placed into Category 5.

**Column C** – The waterbody receives pollutant loadings from both natural background and anthropogenic sources. The applicable numeric criterion is exceeded, and therefore, the waterbody is considered impaired and belongs the 303(d) list or Category 5.

**Column D** – The waterbody receives pollutant loadings from only natural background sources, and the applicable numeric criterion is exceeded. The waterbody is considered impaired and belongs on the 303(d) list or Category 5 unless the State’s water quality standards include a natural conditions provision consistent with the standards provision quoted above.

[From “Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions”(EPA, October 12, 2006 [http://www.epa.gov/owow/tmdl/2008\\_ir\\_memorandum.html](http://www.epa.gov/owow/tmdl/2008_ir_memorandum.html))]

Fortunately New Hampshire’s surface water quality standards include a naturally occurring provision for most pollutants. As indicated below, Section 3.1.8 of the CALM discusses the 3 conditions used in this assessment when exceedances could be attributed to natural conditions.

“For this assessment, only the following three conditions were considered naturally occurring (see Section 3.2.4):

- low pH caused by naturally occurring organic acids, where the presence of organic acids is based on color measurements as described in Section 3.2.4,
- Aluminum exceedances due to naturally occurring low pH (low pH can solubilize naturally occurring metals such as aluminum in sediments, resulting in increased water column concentrations),
- pH values greater than 8.0 but less than or equal to 8.5 in tidal waters unless there was evidence to indicate the elevated pH levels were due to human activity.

Although there are other exceedances that are suspected to be of natural origin (such as bacteria exceedances due to wildlife), the source was listed as unknown for this cycle since a process has not

yet been clearly defined for determining when the source can be considered natural. As more processes for determining natural occurring conditions are developed and implemented, it is expected that the number of waterbodies with exceedances attributed to natural sources will increase.”

In general, DES agrees with the comment that the CALM should include other conditions when the naturally occurring provision can be used and is currently working with the WQSAC to develop them. However, as indicated in Section 3.1.8, a defensible process for each situation first needs to be developed that clearly defines when the source can be considered natural. Once developed the conditions can then be incorporated into the CALM and used in future assessments. As we work with the WQSAC on developing additional conditions when the naturally occurring provision may be used, we will try to address the specific recommendations made by the commenter (i.e., naturally low pH and low dissolved oxygen in the epilimnion, natural levels of nutrients, etc.).

**COMMENT (4):**

4. Data Age, Section 3.1.11- We support the acceptance of 10 years as a maximum age of data for use for lakes and ponds. However, regarding the requirement for waters previously listed as impaired- this should be modified to exempt waters previously listed as impaired that were subsequently de-listed due to reasons listed in 3.1.25.

**DES RESPONSE:**

When making assessments, DES does exactly what the commenter suggests but agrees that the CALM is not clear in this regard. To make it more obvious, DES has modified Section 3.1.11 as follows (revisions in bold):

“The data age requirements shown in Table 3-9 apply in all cases except waters previously listed as threatened or impaired that have not since been removed from the threatened or impaired waters list for any of the reasons specified in section 3.1.25. In such cases, the data used to make the original assessment, regardless of its age, was included in the reassessment provided it met all other data requirements (including the minimum number of samples) stipulated elsewhere in this assessment methodology. This was done to prevent removal of waters from a threatened or impaired category based solely on data age.

**COMMENT (5):**

5. Benthic Index of Biological Integrity (BIBI), page 3-48-

- Is setting this at a single threshold number appropriate given the inherent variability of natural ecosystems? Perhaps a range of values would be better suited for this parameter to represent the biological integrity of the Assessment Unit.
- Is the BIBI and associated rock basket technique specified appropriate for use in lakes, ponds, rivers, streams and estuaries? If so, why? If not, this section should be expanded to include methodologies appropriate to each type of water body.
- Can the guidance document for the measurement referenced be posted online?

**DES RESPONSE:**



Within a given IBI a single value is necessary in order to determine support/non-support. If we determined that a separate IBI should be developed for low gradient stream then a separate IBI would be generated for those stream types. Care has been taken to ensure appropriate application of the Benthic IBI.

Rock baskets are only used in rivers and streams and the CALM text has been updated to reflect this. At this time there are no lake or estuary IBIs due to a lack of resources to develop them for New Hampshire.

The NH Benthic Index of Biotic Integrity (B-IBI) for Wadeable Streams and the 2006 Threshold Modification to Account for Natural Variation are Appendix 33 of the 2006, 305(b) and available at <http://des.nh.gov/wmb/swqa/>

**COMMENT (6):**

6. Habitat Assessments (pg 3-49): The protocol refers to the use of the habitat assessment in streams. Is this scoring method developed for streams appropriate for lakes, ponds, rivers, streams and estuaries? If so, why? If not, this section should be expanded to include appropriate methodologies appropriate to each type of water body.

**DES RESPONSE:**

This habitat assessment methodology is only appropriate for rivers and streams.

We agree that additional methodologies would be beneficial and hope to research habitat assessment methodologies for other waterbody types and incorporate them into the CALM as time and resources allow.

**COMMENT (7):**

7. Chloride analysis criteria – p 3-51:

- Item 5.a, 5b. It may be appropriate for small water bodies (ponds and streams) to use the storm and melt even critical period criteria to avoid false Fully Supporting designations due to dilution. However, for lakes and larger water bodies, dilution effects from individual storm and melt events are not likely to result in significant water quality changes. This approach would needlessly exclude data that would provide an accurate picture of the chloride levels in lakes.
- Item 5.c - We do support use of the relationship between chloride and specific conductance.

**DES RESPONSE:**

First, it is important to note that chloride is not a “core” indicator for determining support of aquatic life. That is, according the CALM, a waterbody can be assessed as fully supporting of the aquatic life use even if there is no chloride (or specific conductivity) data available.

If, however, chloride (or specific conductivity) data is available and it indicates a violation chloride water quality criteria in accordance with the CALM, then we would conclude that the designated use

of aquatic life is impaired since there is at least one parameter (i.e., chloride in this case) that violates water quality criteria for aquatic life.

However, if one wanted to conclude that a waterbody was in compliance with water quality criteria for chloride, then data would be needed as specified in note 5a. and 5b. of Indicator 5 (Water Quality Criteria for Toxic Substances in the Ambient Water). DES agrees that there may be situations where dilution is so high that one could probably conclude, based on less data than currently required in the CALM, that chloride is not causing impairment. However, until criteria are developed (based on data) specifying when less data is needed, DES will continue to require data in accordance with notes 5a and 5b to assess compliance with chloride criteria. To do otherwise, would result in “presumed” assessments which are discouraged by federal guidance and contrary to DES’ goal of data driven assessments. DES appreciates the comment and will add this to the list of items to be worked on in the future to improve our CALM and assessment of New Hampshire’s surface waters.

Finally, DES agrees that it is appropriate to use the chloride / specific conductance relationship to assess chloride and has over 1860 paired measurements illustrating a very strong relationship between these two parameters.

**COMMENT (8):**

8. 3.2.8. Wildlife Use (p. 3-62)- The assessment criteria and core indicators need to be developed. We suggest the Fully Supporting assessment be based on a wildlife survey conducted by a qualified professional wildlife biologist that determines that the water is adequate to support wildlife use appropriate for the ecoregion with no obvious and significantly detrimental impairment related to water quality.

**DES RESPONSE:**

We appreciate the suggestion and will consider it as we move forward with developing assessment criteria and core indicators for the wildlife designated use.